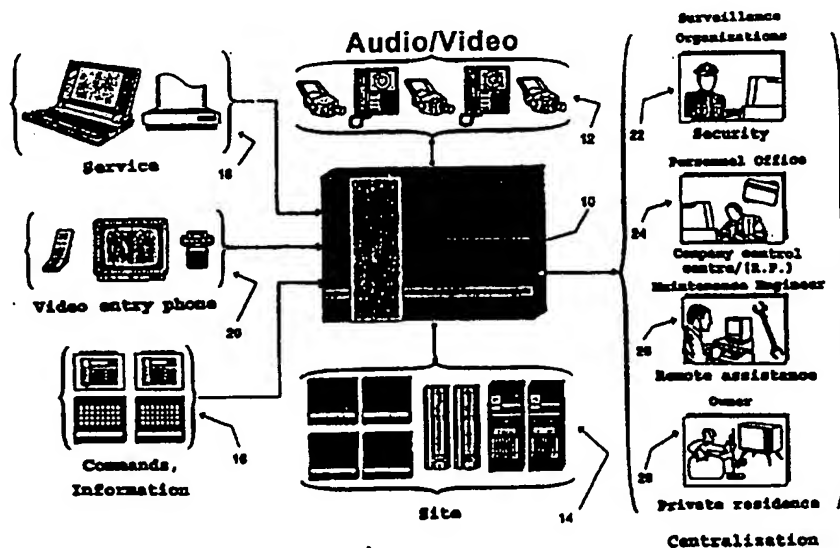




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<b>(21) International Application Number:</b> PCT/IT95/00187 <b>(22) International Filing Date:</b> 14 November 1995 (14.11.95) <b>(30) Priority Data:</b> RM94A000739 14 November 1994 (14.11.94) IT <b>(71) Applicant (for all designated States except US):</b> EMMEPI TELEMATICA E SICUREZZA S.P.A. [IT/IT]; Via Torino, 64, I-00040 Pavona (IT). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> DI PASQUALE, Carlo [IT/IT]; EMMEPI Telematica & Sicurezza S.p.A., Via Torino, 64, I-00040 Pavona (IT). SETTIMINI, Luigi [IT/IT]; EMMEPI Telematica e Sicurezza S.p.A., Via Torino, 64, I- 00040 Pavona (IT). <b>(74) Agent:</b> CAVATTONI, Massimo; Studio Tecnico Brevetti Massimo Cavattoni, Via Archimede 144, I-00197 Roma (IT).		<b>(81) Designated States:</b> AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, LS, MW, SD, SZ, UG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the</i> <i>claims and to be republished in the event of the receipt of</i> <i>amendments.</i>

**(54) Title: DEVICE FOR THE REMOTE MONITORING OF REMOTE EQUIPMENT****(57) Abstract**

A device (28) for the remote monitoring of remote equipment (12) is described, characterized in that it comprises, in combination, a microprocessor (30) provided with its own RAM and ROM; means (54) of interfacing between the said microprocessor and a telephone line (56); means (60) of interfacing between the said microprocessor and a domestic telephone (58); and means (50) of interfacing between the said microprocessor and a domestic television, the disposition being such that the said microprocessor is connected through the said switched telephone line to the said remote equipment to execute its remote monitoring and control, receives commands and data from the user through the keyboard of the said telephone and displays on the screen of the said domestic television information and data originating from the said remote equipment, as well as requests for the entry of data and commands by the user.

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DESCRIPTION

## DEVICE FOR THE REMOTE MONITORING OF REMOTE EQUIPMENT

5 The present invention relates to the field of remote surveillance and remote alarm equipment and in particular relates to a device typically for domestic use for the remote monitoring and control of remote surveillance and alarm equipment.

10 There is known surveillance and alarm equipment designed to be installed in premises to be protected and such that it can be brought or can bring itself automatically into contact with controllers for controlling the alarms and of the corresponding data.

15 Equipment of a professional type, very complex and expensive, capable of controlling a large number of remote installations, is provided in the controllers.

20 Such controller equipment is poorly suited to domestic use by individual users who wish to monitor and/or control, alone or in parallel with the controller, a single alarm system, for example one located in the user's business or shop.

This is true not only because of the high cost of professional equipment but also because of the size and difficulty of operation of such equipment.

25 The principal object of the present invention is therefore to provide a device for the remote monitoring of remote equipment, which offers the user a private centralization of his remote security equipment in addition to the services offered by third-party organizations.

30 Another object of the present invention is to provide a simplified device for the remote monitoring of remote equipment of limited cost and size and therefore suitable for domestic use.

35 A further object of the present invention is to provide a simplified device for the remote monitoring of remote equipment having a simple and economical structure suitable for mass production.

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According to the present invention, a device for the remote monitoring of remote equipment is characterized in that it comprises, in combination,

- a microprocessor provided with its own RAM and ROM;
- 5 - means of interfacing between the said microprocessor and a telephone line;
- means of interfacing between the said microprocessor and a domestic telephone; and
- means of interfacing between the said microprocessor
- 10 and a domestic television,

the disposition being such that the said microprocessor is connected through the said switched telephone line to the said remote equipment to execute its remote monitoring and control, receives commands and data from the user through the keyboard of the said telephone and displays on the screen of the said domestic television information and data originating from the said remote equipment, as well as requests for the entry of data and commands by the user.

- 20 The principal advantage obtained with the device for the remote monitoring of remote equipment according to the present invention is that it puts the user in charge of the control of the security of his assets, by giving him the freedom to assign or withdraw the control
- 25 of the security equipment at any moment from his own residence.

The present invention will be further explained and other advantages will be demonstrated by the description of a practical embodiment of the device for the remote monitoring of remote equipment according to the present invention, this description being provided purely by way of example and without restriction, with reference to the attached drawings, in which:

- 30 The present invention will be further explained and other advantages will be demonstrated by the description of a practical embodiment of the device for the remote monitoring of remote equipment according to the present invention, this description being provided purely by way of example and without restriction, with reference to the attached drawings, in which:
- 35 Figure 1 is a diagram showing a remote surveillance and remote alarm installation comprising a device according to the present invention;

Figure 2 is a block diagram of the principal microprocessor module of the device according to the present invention;

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Figure 3 is a block diagram of the slow video signal control module of the present device; and

Figure 4 is a block diagram of the local bus control module of the present device.

5 With reference to the attached drawings, and in particular to Figure 1 of the drawings, it will be seen that there is a generic remote surveillance and remote alarm installation comprising a controller 10, installed near or within the premises to be protected, this  
10 controller executing its functions through video cameras and audio listening installations indicated in a general way by the number 12, as well as environmental sensors, coded door openers, badge readers for monitoring access and other site monitors indicated in a general way by the  
15 number 14.

The controller 10 may be operated through devices 16 for sending commands and information; it is also possible to interact with the controller 10 through service devices 18 and video entry phone equipment 20.

20 The controller 10 communicates, generally through a telephone line or a dedicated link, with an operation control centre 22, a company control centre 24 and/or a remote assistance centre 26.

25 According to the present invention, there is now provided a device 28, particularly designed for use, for example, in the private residence of the owner of the protected premises, for example at the home of the proprietor or manager of a business or similar.

30 The present device 28 for the remote monitoring of the remote equipment 10, although it has limited resources, is nevertheless capable, as will be seen, of acting as an operation control centre and of monitoring the state of the protected environments.

35 The device 28 according to the present invention comprises, as shown more clearly in Figure 2, a base module, or principal module, in which a microprocessor (CPU) 30, provided with its own RAM bank 32 and ROM bank 34, containing data and programs, and suitable interface devices, uses a domestic television, a commercial video

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recorder and an ordinary domestic telephone to form a link to the controller 10 (see Figure 1) and thus to monitor the protected premises. This principal module will subsequently be referred to as the CPU module.

5           The microprocessor 30 is linked through an input and output interface 36 to two light-emitting diodes (LEDs) 38 and 40, for signals relating to the state of the device, and to a push-button switch 42, while a surveillance module 44 ensures the constant operation of  
10       the microprocessor 30 by forcing its reset if it enters infinite cycles as a result of external events.

          The microprocessor 30 also communicates with a modem 46 through a serial interface 48, while it communicates through a parallel interface 50 with all the  
15       electronic switching devices for the routing of the signals.

          The microprocessor 30 also communicates through the parallel interface 50 with a dual tone multiple frequency (DTMF) standard tone receiver and transmitter  
20       module 52, for the generation and recognition of commands and data exchanged, through a telephone line interface 54 and a switched telephone line 56, with the controller 10 and with any other connected equipment.

          The user can send initializations and commands to  
25       the present device by means of an ordinary telephone 58, through a control interface 60 and an "off-hook" detector 62.

          During the initialization and programming phase, the microprocessor 30 communicates with the user by  
30       displaying menus of selections on the screen of a domestic television connected to a SCART type socket 64, through the parallel interface 50, a titles generator 66, a video synchronizing generator 68, a digital-analog (D/A) video converter 70 and a video buffer 72.

35       The microprocessor 30 also communicates through the parallel interface 50 with a module 73 for receiving and decoding signals in the infra-red band, for the reception and recognition of further commands and data also received from the user through an infra-red remote

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controller of the type usually provided with domestic televisions.

A stabilizer 74 with switching regulation, supplied from the exterior with direct current, provides  
5 the necessary voltages and currents for the operation of the present device 28 for the remote monitoring of the equipment 10.

An independent module, known as the "slow video module", shown in Figure 3, is provided for the process-  
10 ing of the slow video mode signals originating from the video cameras 12 installed in the protected premises or from any local video cameras, in other words those positioned at the user's residence.

In the circuit of the slow video module in Figure  
15 3, the slow video standard signal from the switched telephone line or from the local video cameras is first demodulated in a demodulator 76, after which the synchronizing signals are separated by a synchronizing separator 78, while the video signal is converted to  
20 digital form by an analog-digital (A/D) converter 80.

The digital video signal is stored in a multiple-page video memory 82 by a programmed logic device 84. The video information may be retrieved from this video memory 82, one page at a time, under the command of a video page  
25 selector 86, sent to the D/A converter 70 through a buffer 88 and then displayed on the television or recorded on a video recorder connected to a SCART type socket 90.

Another independent module, namely a module 92  
30 for interfacing with the peripherals and with the local buses, known as the "local bus module", shown in Figure 4, is provided to control the detection and alarm equipment situated at the user's residence, in other words the local equipment according to the terminology used here.

35 The module 92 has a socket 94 for the connection of a local closed-circuit television (CCTV) standard video channel, for example one according to the CCIR or a similar EIA standard, such as that running from a local video intercom, and a socket 96 for the connection of an

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audio channel, such as that running from a local intercom, an audio amplifier 98 being connected in the connection line of the latter to provide correct signal levels.

The module 92 also has a terminal 100 for the local bus, designed to connect a controller of the same type as the controller 10 in Figure 1 and, through this, the peripheral equipment of the type shown in Figure 1 as connected to the controller 10. Such equipment, installed as stated previously at the user's residence, is of the ordinary type used for these applications and may comprise environmental sensors, coded door openers and other site monitors, together with devices for sending commands and information.

The microprocessor 30 communicates with the terminal 100 for the local bus through a serial interface 102, followed by a standard RS485 interface or a standard RS232 interface. It will be noted that the CCTV standard video channel, the audio channel and the local bus form a true multi-media channel, designed to support the local applications.

Naturally, either the slow video module (Figure 3) or the local bus module (Figure 4), or both modules, may be omitted if their services are not required by the user.

The operation of the device 28 for the remote monitoring of remote equipment according to the present invention takes place in the way which will be described below.

Where the interaction of the user with the machine is concerned, this is based on the use of two areas of the television screen, each consisting of two lines of twenty characters.

The first area, at the top of the screen, is used to display to the operator the menus by means of which all the operations on the device 28 may be executed.

The second area, at the bottom, having the same dimensions, is used to display alarm and state signals from the peripheral equipment.

This information replaces the normal video image



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or that received from the local video camera, while it is superimposed on any image from the slow video system.

In normal operation, the device 28 does not send information to the television equipment, permitting  
5 ordinary reception of television programmes. The telephone is also connected normally to the telephone line.

When the user wishes to interact with the device 28, he must select the SCART socket input on the television, raise the telephone handset and dial a special code  
10 on the telephone keypad. The device 28 then switches the telephone to the local services and displays the main menu on the television. At the end of the operation, from the main menu, the user replaces the handset and the device 28 restores the telephone connection to the  
15 telephone line and releases the video circuits from the SCART socket.

However, if the television is set to receive from the SCART socket and there are alarm signals present in the device 28, these will always be displayed together  
20 with the main menu, replacing the normal television image. This situation continues until all the stored alarms have been captured.

The selection among the various items on each menu and the entry of the parameter values are carried  
25 out by means of the telephone keyboard, in such a way that it is possible to enter alphanumeric information and certain control characters.

The initial selection menu displays four possible groups of activities, namely configurations, displays, activations, and programming of the parameters of the  
30 function of transfer to a similar device, as explained below.

The user does not have to enter strings of commands: he only has to move among a number of menus, make selections in the menus and enter the value of  
35 numeric and alphabetic parameters.

To access the functions at various levels, access passwords for various levels are obviously required.

It should be noted that the composition of the

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menus is not affected by the current state or situation. If the operator selects a function which cannot be executed, he will be advised of this by the sound of a buzzer (not shown) and the display of a message.

5           The two LEDs 38 and 40, one red and one three-coloured (red, green and amber), and the push-button switch 42 are also present on the front panel of the device 28.

          The first LED has the following function:

- 10   -   it is constantly illuminated if alarm signals which have not yet been captured by the operator are present in the device 28;
- it flashes if non-alarm signals which have not yet been captured by the operator are present in the device
- 15   28.

          The second LED indicates the operational state as follows:

- |    |                   |                               |
|----|-------------------|-------------------------------|
| -  | constant red:     | fault or malfunction          |
| -  | flashing amber:   | device communicating through  |
| 20 |                   | the telephone line            |
| -  | flashing green:   | appears during the period     |
|    |                   | programmed for the activation |
|    |                   | of the "follow me"            |
|    |                   | function (explained below)    |
| 25 | - constant amber: | device operational            |
|    | - constant green: | device on stand-by.           |

          When there is more than one situation to be displayed, the display priority is as shown in the above explanation; additionally, the push-button switch 42 is

30   used to switch the device 28 from the stand-by state to the operational state and vice versa.

          The buzzer mentioned above is then used as follows:

- 35   -   it is activated when an alarm signal arrives from a peripheral;
- it is switched off after a time limit or when the user raises the telephone handset;
- it is briefly activated when an intercom call, either local or remote, is recognized.

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Where the operation of the present device is concerned, the following four phases may be distinguished:

a) - The phase of configuration and preparation of the machine. In this phase, the user provides all the configuration parameters required for correct operation by the device 28 and by all the equipment to be controlled. During the execution of this phase, the device 28 operates on a copy of the current configuration and updates the real configuration only on exit from the function. This structure, disposition and organization of data makes it possible to respond to any connection requests sent from the periphery, which will be handled in accordance with the consolidated real configuration.

The device 28 will refuse to execute this phase if alarm signals which the user has not yet received are present in the memory.

During this phase, the user supplies the device 28 with, and stores in it, information of various types, including: installation options, installation codes, number of rings a waited before the line is engaged, programming of the wait time for the intervention of the user in the intercom call, specification of the time bands for automatic calls for the remote controller 10 during the day and during the various days of the week, allowing for religious holidays, true solar time and holidays. Other data may relate to the possibility of calling another device 28 located elsewhere, typically at a second residence of the same user.

The device 28 can transfer the connection to another similar device 28. This is very desirable in the case in which the user leaves his habitual residence and goes to a second residence in which another device 28 is installed, or to the premises of the owner of another device similar to his own. In this case, he will find it very convenient to program his monitoring device in such a way that it and the monitored controller 10 are temporarily linked to the other device.

By way of definition, the device accessible to the user for operation will be called the "manned

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device", while that which is not accessible to the user, and for which the control of the network of peripherals is assigned to another monitoring device disposed in another locality, will be called the "remote device".

5           If a connection to another similar device is provided, the remote device must be informed that from a certain time and for a specified period there will be no manning and that therefore, if necessary, it must capture information arriving from the peripherals and immediately  
10 afterwards call another number, with the entry of the number of the manned device to which any captured information is to be sent. In the connection between two devices 28, regardless of which of the two devices has called, the remote device will always act as the principal device (master), while the manned device will act as  
15 the secondary device (slave); the remote device will supply all the alarm data, but not the video images, stored in its memory, while access to the remote device by the manned device must naturally be subject to the  
20 entry of a password.

This operating mode is referred to herein as the "follow me" procedure.

b) - The phase of connection of the device 28 to the controller 10 or other peripheral equipment. The  
25 connection may be initiated locally, for example by the user or by the activation or disabling of a peripheral or of the data transmission request, in which case the device 28 attempts to make the connection. Conversely, the connection may be initiated by the peripheral equip-  
30 ment, in which case the device 28 is required to respond to the call from the telephone line.

The control logic of the two communication channels (local bus and telephone line) is very simple: all connection requests relating to one channel will be  
35 met if the channel is free at that moment, independently of the operational state of the machine. If the channel is engaged, the requests generated by the automatic activities will be queued while those generated by the user's request will be rejected.

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The menu on the screen is not normally affected by the activities of connection and subsequent data exchange. The only effect may be on the alarms line which will be updated according to the first alarm received, which will also be signalled acoustically by the equipment's buzzer.

If the user is working, even if connected to a peripheral unit, he must voluntarily interrupt the activity and connect by means of the menus to the channel connected to the peripheral with which he is to interact. It should be noted that a time limit is provided for operator requests before a call is interrupted.

When the connection has been originated by the device 28, there are two possible cases: in the first case, in which the connection is made at the user's request, the following operations take place:

- recognition of the request and certification of the requester;
- preparation of the audio/video circuits;
- request for the identification code of the peripheral;
- if the peripheral is local, the procedure terminates;
- automatic calling of a remote peripheral;
- control of the procedures of physical connection to the remote equipment;
- opening of the remote communication session, with certification of the connection and the access level.

If a call fails, the negative outcome of the request is signalled to the user.

Conversely, if the request originates from the activation of an automatic operation, the following operations are executed:

- check of the availability of the telephone line by means of the off-hook detector 62; if the line is engaged, the buzzer is activated briefly and there is a wait for a fixed time until the line is free, but after this time the system proceeds anyway;

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- preparation of the audio and video circuits;
- automatic call;
- control of the procedures of physical connection to the remote equipment;
- 5 - opening of the remote communication session, with certification of the connection and the access level;
- in case of failure of the connection, repetition of the call according to the programmed parameters.

10       The local peripheral, if configured, is considered to be permanently connected.

      The connection fails in the following cases: if the remote unit does not answer, if the remote unit is not recognized, or if the line is disconnected before the  
15       programmed automatic operation has been executed.

      A special mode is also provided, enabling the manned device 28 to connect to peripherals of another installation. In addition to the identity code of the peripheral, the following are requested: the telephone  
20       number to be dialled, the type of peripheral, the installation code and the connection password for the mutual recognition.

      In the case of a connection requested by peripheral equipment, the following phases are executed:

- 25 - after the programmed number of rings, the device 28 connects to the telephone line, prepares the audio and video circuits, carries out the functions relating to the physical connection, and opens the remote communication session, certifying the identity of the parties;
- 30 - if the line is engaged by another device before the completion of the programmed number of rings, for example by a telephone, a modem or an answering machine, the device 28 decides whether the call is  
35       being made by a peripheral associated with it, in which case it connects to the line and the procedure continues as in the preceding case. If, however, the calling equipment is not associated with it, the device 28 takes no action.

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During all these connections, the following functions are available: reception from peripherals and storage of alarm and event messages, data, and slow video images, as well as requests for immediate connection to the intercom; configuration of peripheral equipment, selection of video cameras and other slow video sources, bidirectional remote listening, activation and disabling of outputs, display of the state of the inputs, and requests for sending messages.

10           The connection may be interrupted in the following cases:

- if the peripheral equipment has no further information to send and a time limit on the operator's requests has expired;
- 15   - if the user orders the interruption;
- if an interruption of the connection is detected by the logic connection controller;
- if an interruption of the connection is detected by the physical connection controller.

20           c) - The phase of connection to another device 28 during the "follow me" procedure. In this phase, the following activities are possible:

- transfer of alarm data and any corresponding slow video images stored in the remote device 28;
- 25   - selection and transfer of slow video pages stored in the remote device 28, even if they are not relevant to alarms;
- transfers of event messages;
- selection of a local video camera of the remote device 28 and transfer of the slow video image to the manned device 28;
- 30   - change by the manned device 28 of the activation interval of the "follow me" procedure of the remote device 28.

35           d) - The phase of local use. During this phase, local interrogation takes place for the display of information received by the connected equipment. This activity enables the user to see the information stored in the device 28 following preceding connections.

In this state, the device 28 can answer calls from peripherals, while it postpones any calls originating from programmed automatic cycles.

The types of information which can be displayed  
5 are as follows:

- alarm signals originating from the controller 10;
- event signals;
- data in transit;
- slow video pages.

10 It will be evident from the above disclosure that the device 28, communicating with its own user through the television and the keyboard of the telephone keyboard in regular use, basically provides the following services:

- 15 - reception, storage and video display of alarms and signals originating from the peripheral equipment;
- interrogation of specific peripheral equipment for the collection of the same data for the control of its configuration;
- 20 - bidirectional audio connection to the peripheral equipment;
- activation and disabling of the outputs and display of the state of the inputs; automatic connection and disconnection of controllers according to a calendar;
- 25 - connection to a second similar device to transfer to the latter, in a specific time interval, any alarm signals received in this interval, according to the "follow me" procedure.

30 The slow video module provides the additional facility of receiving, storing and restoring on the television several video pages sent by the peripheral equipment over the telephone line.

The local bus module provides the following additional functions:

- 35 - connection to local equipment such as the controller 10;
- bidirectional audio connection to a local intercom;
- video reception from a local video camera, for



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example one belonging to a CCTV standard intercom, which may be selected by an external switchboard, with restoration of the image in real time on the user's television and video recorder;

- 5 - transmission of a slow video signal taken from a suitable external converter and originating from a local video camera, which may be selected by means of a switchboard, or from the slow video receiver.

10 The audio and video circuits are configured in such a way that the corresponding audio and video signals meet the following requirements:

- ordinary use of the telephone and of any connected equipment, such as fax, modem and answering machine;
- use of the telephone as the control terminal of the device 28;
- 15 - use of the telephone for remote listening and remote intercom functions;
- use of the telephone as a local intercom;
- use of the telephone line for the control of the peripheral equipment;
- 20 - reception from the telephone line and storage of slow video images;
- ordinary use of the television and video recorder;
- use of the television as the output terminal of the device 28;
- 25 - restoration of the previously stored slow video images on the television and on the video recorder;
- restoration of the image from the selected local video camera in real time on the television and on the video recorder;
- 30 - transmission of slow video images received and stored previously, by the "follow me" procedure.

Obviously, numerous other variations and modifications may be made by those skilled in the art to the embodiment of the present invention described above, without departure from the principle of the invention. All such variations and modifications are therefore considered to be included within the scope of the invention.

35

CLAIMS

1. Device for the remote monitoring of remote equipment, characterized in that it comprises, in combination,
- a microprocessor provided with its own RAM and ROM;
  - 5 - means of interfacing between the said microprocessor and a telephone line;
  - means of interfacing between the said microprocessor and a domestic telephone; and
  - means of interfacing between the said microprocessor
  - 10 and a domestic television,
- the disposition being such that the said microprocessor is connected through the said switched telephone line to the said remote equipment to execute its remote monitoring and control, receives commands and data from the user
- 15 through the keyboard of the said telephone and displays on the screen of the said domestic television information and data originating from the said remote equipment, as well as requests for the entry of data and commands by the user.
- 20 2. Device according to Claim 1, characterized in that it also comprises means of processing the slow video signal, contained in a slow video module, the disposition being such that slow video standard images originating from the said remote equipment are received through the
- 25 said switched telephone line, are stored and are then displayed in pages on the screen of the said domestic television.
3. Device according to Claim 1 or 2, characterized in that it also comprises means of interfacing between
- 30 the said domestic television and a CCTV standard local video channel, the disposition being such that the signal present in the said local video channel is displayed as an image on the said domestic television under the control of the said microprocessor.
- 35 4. Device according to Claim 2 or 3, characterized in that it also comprises means of interfacing between the said microprocessor and a commercial video recorder, the disposition being such that the said images are

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recorded on the said commercial video recorder under the control of the said microprocessor.

5. Device according to any of the preceding claims, characterized in that it also comprises means of interfacing between the said domestic telephone and a local audio channel, the disposition being such that the said domestic telephone is put into communication with the said local audio channel under the control of the said microprocessor.

10 6. Device according to any of the preceding claims, characterized in that it also comprises means of interfacing between the said microprocessor and a local bus, the disposition being such that numerous items of control and surveillance equipment, disposed locally, are monitored locally by the said microprocessor through a local controller.

7. Device according to Claims 2 and 6, characterized in that the said local bus is connected, through the said local controller, to a slow video standard camera, positioned locally, the disposition being such that the slow video standard signal, carrying local information, is displayed on the said domestic television under the control of the said microprocessor.

8. Device according to any of the preceding claims, characterized in that it also comprises a module for receiving and decoding signals in the infra-red band and means of interfacing between the said microprocessor and the said module for receiving and decoding signals in the infra-red band, the disposition being such that the said microprocessor also receives commands and data from the user through an infra-red remote controller of the type usually provided with domestic televisions.

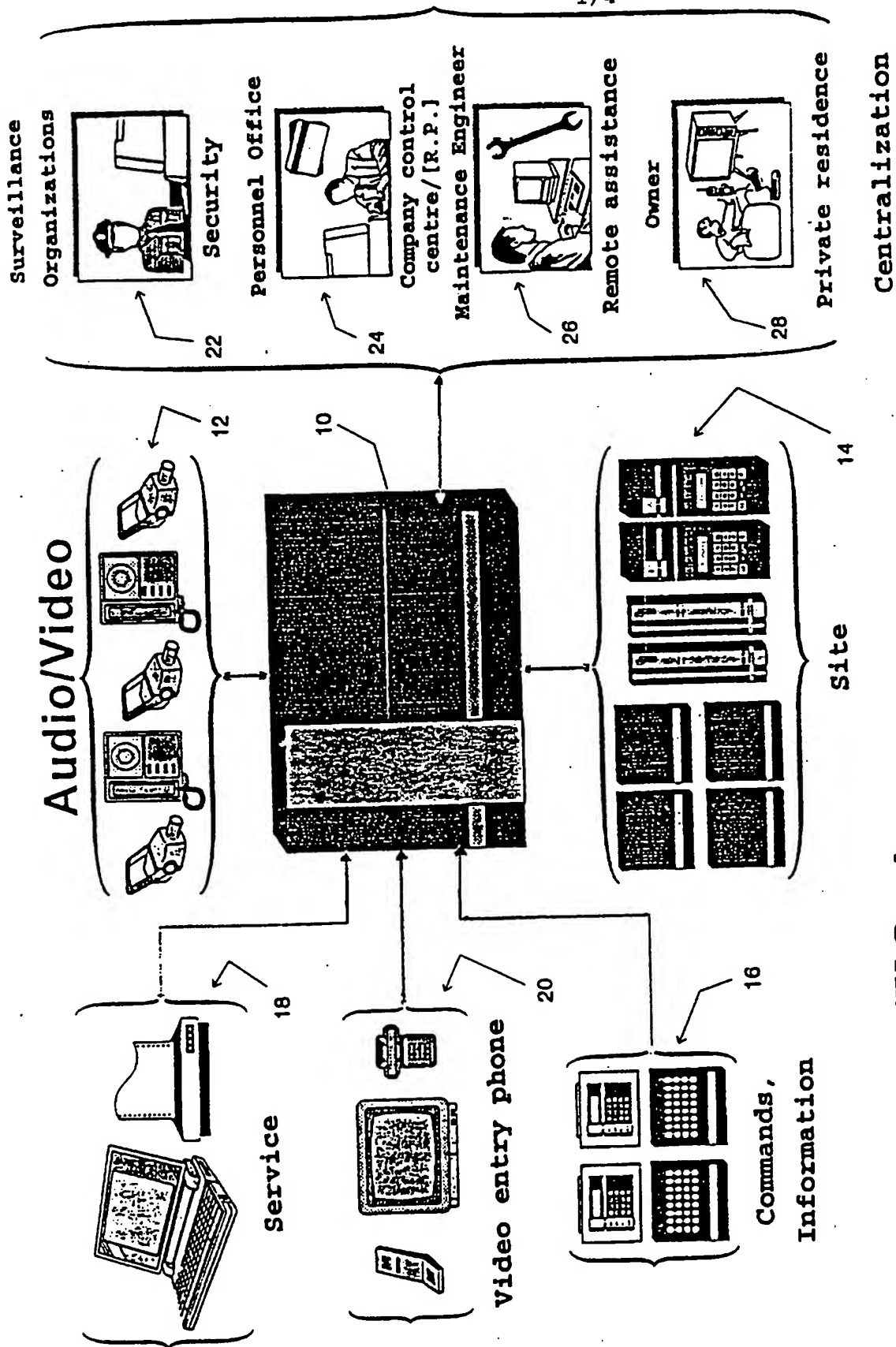
9. Device according to any of the preceding claims, characterized in that it also comprises numerous light-emitting diodes for signalling its operating state, interfaced with the said microprocessor.

10. Device according to any of the preceding claims, characterized in that it also comprises a buzzer for signalling its alarm states, interfaced with the said

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microprocessor.

11. Device according to any of the preceding claims, characterized in that it also comprises a push-button switch, interfaced with the said microprocessor, for use
- 5 by the user.



**FIG. 1**

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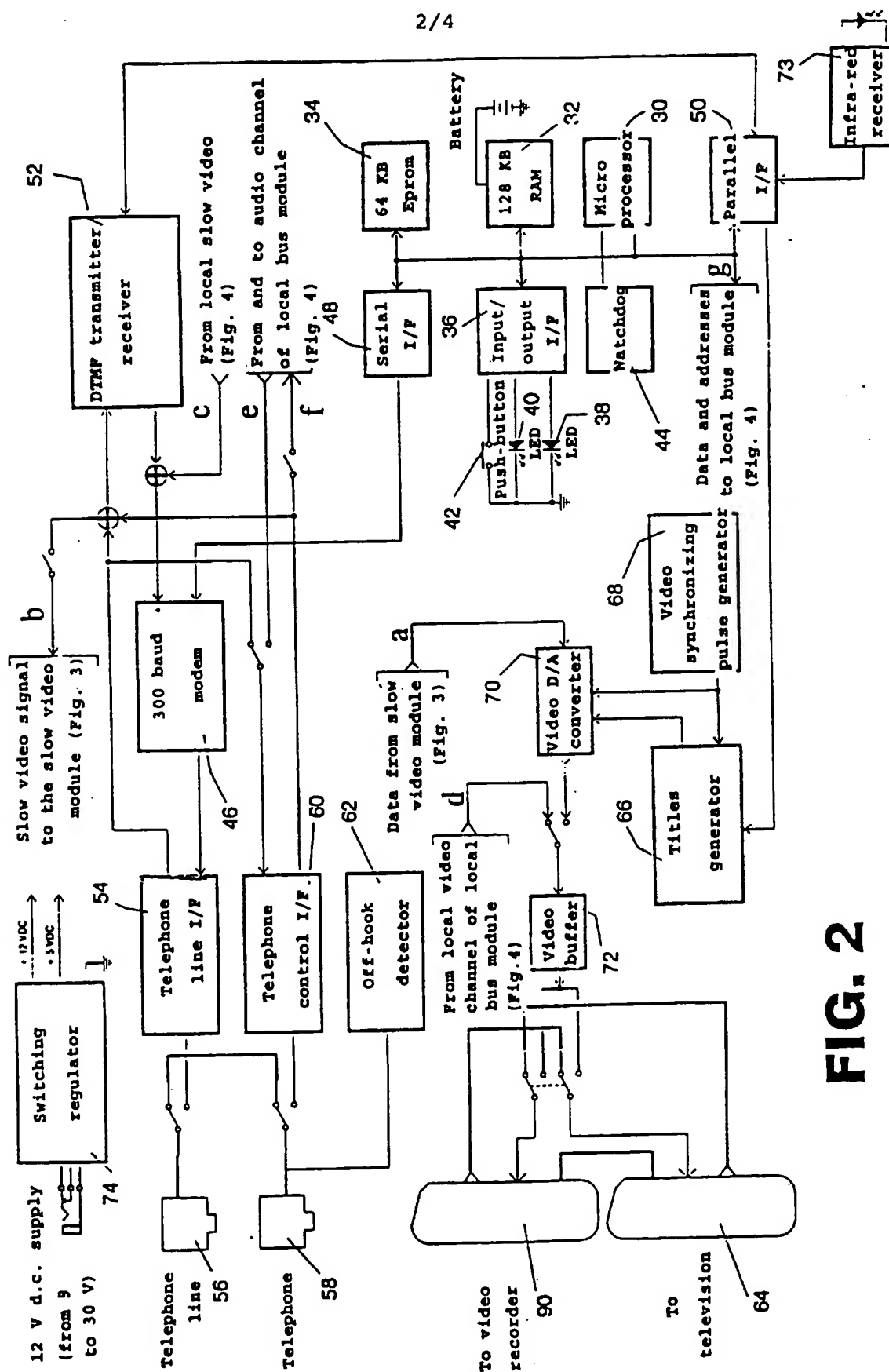
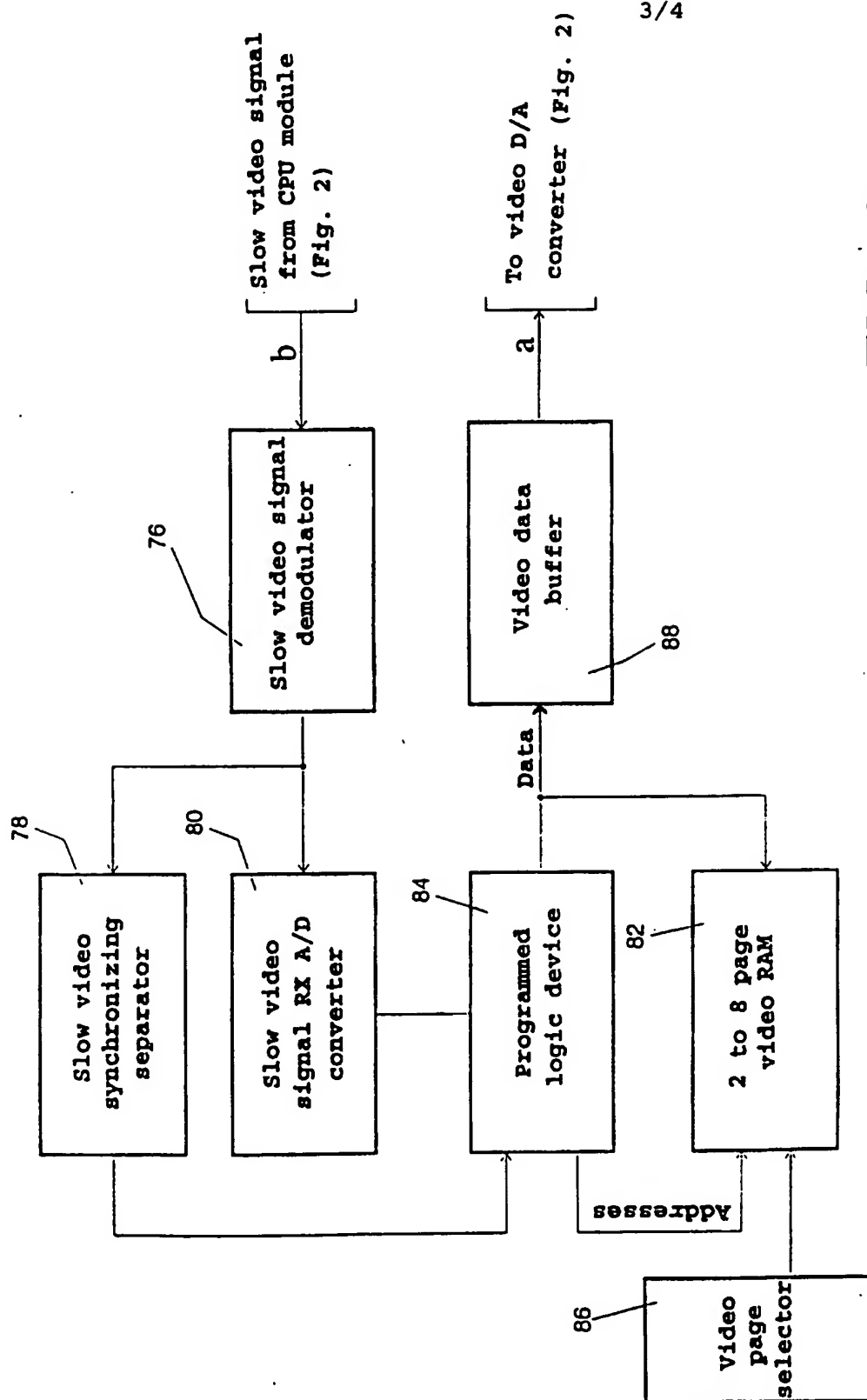


FIG. 2

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**FIG. 3**

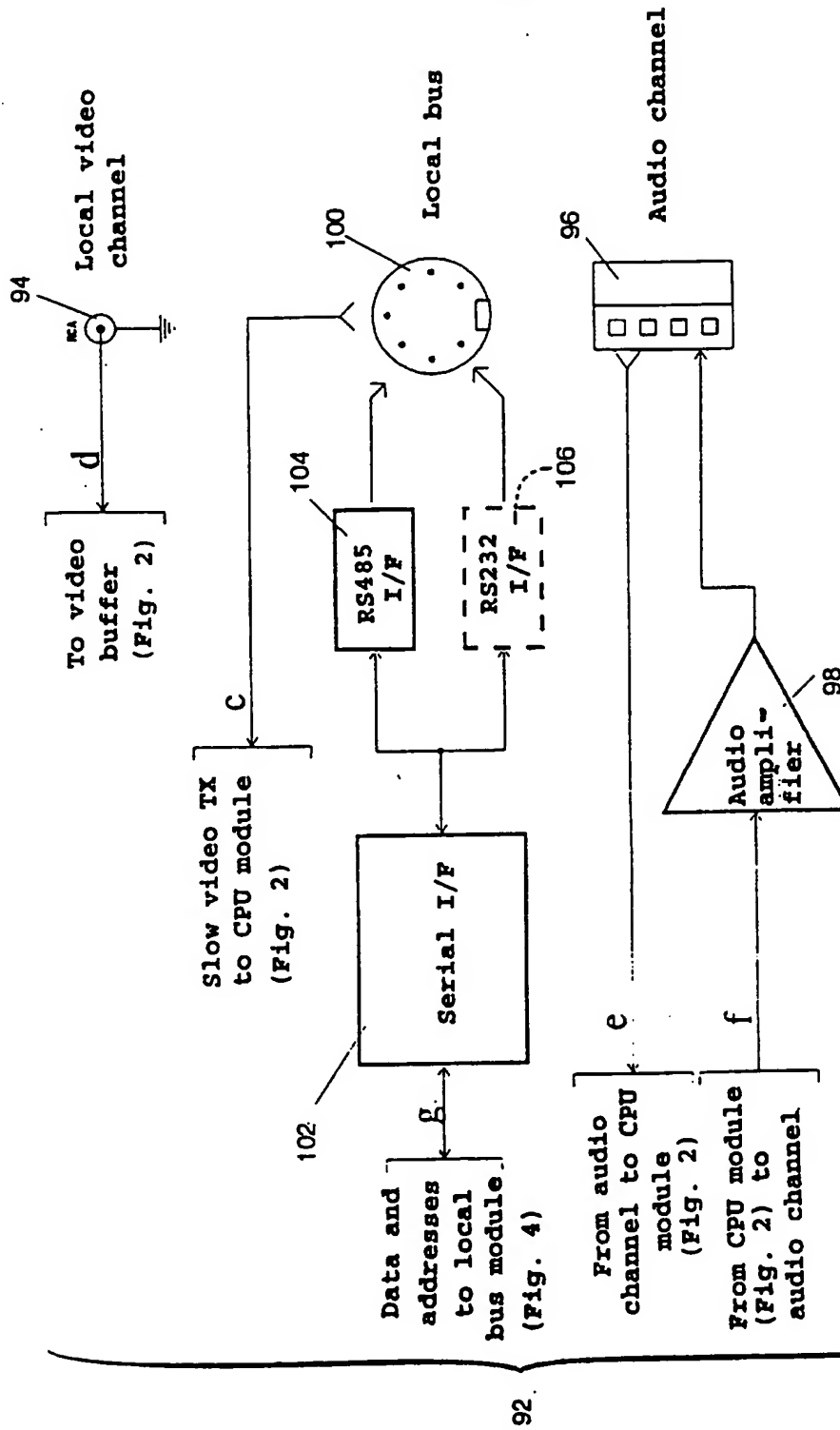


FIG. 4



## INTERNATIONAL SEARCH REPORT

International Application No

PCI/IT 95/00187

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 H04M11/04 G08B25/08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 H04M G08B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP-A-0 429 364 (GOLDSTAR CO. LTD.) 29 May 1991 see column 1, line 16 - line 40 see column 2, line 1 - line 28 see column 6, line 19 - line 29 see column 7, line 30 - line 40 see column 8, line 21 - line 26 see column 9, line 11 - line 40 see figures 1,3	1-6
A	--- -/--	7

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

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Date of the actual completion of the international search

22 March 1996

Date of mailing of the international search report

12.04.96

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## INTERNATIONAL SEARCH REPORT

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PCT/IT 95/00187

C(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>WO-A-92 09955 (EPPS ET AL.) 11 June 1992  see page 6, line 27 - page 7, line 23  see page 9, line 11 - line 14  see page 11, line 7 - line 13  see page 12, line 9 - line 18  see page 13, line 21 - line 24  see page 14, line 5 - line 11  see page 14, line 30 - page 16, line 8  see page 20, line 18 - line 26  see figure 2</p>	1-6
A	---	7
A	<p>COMPUTER SYSTEMS,  vol. 6, no. 1, January 1986 BROMLEY, GB,  pages 55-58,  PETER WRIGHT 'Vision by telephone'  see page 56, left column, line 7 - page  57, right column, line 10</p>	1-4,7
A	<p>---</p> <p>US-A-4 332 980 (REYNOLDS ET AL.) 1 June  1982  see column 4, line 14 - line 27  see column 4, line 50 - line 56  see column 5, line 15 - line 24  see column 6, line 43 - column 7, line 26  see figures 2,6</p>	1-3,5-7, 10,11
A	<p>---</p> <p>EP-A-0 137 158 (TOCOM, INC.) 17 April 1985  see page 2, line 14 - line 30  see page 3, line 2 - line 4  see page 9, line 3 - line 22  see figure 3</p> <p>-----</p>	1-3,7-9

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Information on patent family members

International Application No

PCT/IT 95/00187

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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EP-A-137158	17-04-85	US-A- 4574305 DE-A- 3484972 JP-A- 60048635	04-03-86 02-10-91 16-03-85